

*COMPARISON OF TWO PROCEDURES FOR TEACHING
DICTATED-WORD/SYMBOL RELATIONS TO
LEARNERS WITH AUTISM*

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The efficacy of exclusion and delayed-cue procedures for establishing novel dictated-word/symbol relations with 2 boys with autism was compared using computerized match-to-sample procedures. Acquisition of the relations under the two training conditions was compared via an alternating treatments design. The delayed-cue procedure was more efficacious than the exclusion procedure in four of five comparisons across participants.

DESCRIPTORS: autism, delayed cue, exclusion

Exclusion training has proven to be effective for teaching dictated-word/symbol relations to individuals with mental retardation. When novel word samples and novel symbol comparisons are presented along with known symbol comparisons on match-to-sample trials, conditional relations between the novel words and symbols are often established (e.g., Wilkinson & Green, 1998). However, the learner must have already ac-

quired one or more conditional relations. An alternative method for teaching dictated-word/symbol relations is the delayed-cue procedure, in which a prompt for the designated correct stimulus is delayed progressively across successive trials. Transfer of stimulus control is demonstrated when the learner reliably responds to the correct stimulus before the prompt is presented. However, problems with prompt dependency (waiting for the cue) may occur for some learners (Oppenheimer, Saunders, & Spradlin, 1993).

Experimental analyses of the relative efficacy of exclusion and delayed-cue procedures for establishing new dictated-word/symbol relations for learners with autism could yield data that guide further research on effective classroom-based programs. If results of studies conducted under analogue and naturalistic conditions indicate that these procedures are both highly effective, teachers could select one or the other, depending on other conditions (e.g., the student has several “known relations” in his or her repertoire or is known to be prompt de-

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pendent). Alternatively, modifications to these procedures, such as incorporating delayed cues into exclusion training, should be evaluated if results indicate that learning under one or both procedures could be improved. This study serves as an initial bridge between basic and applied work, comparing the efficacy of delayed-cue and exclusion-training procedures for establishing dictated-word/symbol relations with 2 children with autism and severe language and learning deficits. Maintenance of relations established with each procedure was also assessed.

METHOD

Participants, Setting, and Materials

Jimmy, 9 years old, and Rob, 11 years old, had been diagnosed with autism and severe mental retardation and communicated principally by gesturing and pointing to pictures. Both participants exhibited severe deficits in language comprehension, as evidenced by performances on the Peabody Picture Vocabulary Test–Revised and the Vineland Adaptive Behavior Scales. All sessions were conducted in a room at the participants' school. Participants responded by touching stimuli that appeared on the computer screen. The software, hardware, and general procedures are described elsewhere (see Dube, 1991). Known relations consisted of three dictated words and corresponding line drawings that participants matched reliably on pretests. Novel relations were selected from pools of stimuli that each participant did not match reliably on pretests. Each set included three dictated words and three symbols: dictated nonsense words and symbols (Sets A and B) and dictated English words and pictures (Sets C and D) for Jimmy and dictated nonsense words and symbols (Sets A and B, C and D, and E and F) for Rob.

Procedure

Response acquisition under the two procedures was compared across paired sets of

dictated-word/symbol relations in an alternating treatments design. Exclusion training sessions were divided into four blocks (Figure 1, left panels). Six baseline trials presented known dictated words as samples and corresponding line drawings as comparisons. Three novelty control trials presented known dictated words as samples; comparison stimuli were line drawings that corresponded to the samples (S+) and novel line drawings (S-) to control for a general preference for novel stimuli. Three exclusion trials presented novel dictated-word samples and corresponding line-drawing comparisons with one or more known line drawings as S- to allow the participant to "exclude," or choose away from, the known stimuli. A novel word sample and line drawing different from the designated set was introduced in each block of 12 trials. The second and third blocks presented a novel line drawing with the novel line drawing just introduced in the preceding exclusion trials as S- on control and exclusion trials. The final block consisted of nine outcome test trials with three novel words as samples and the three novel comparisons. The efficacy of the exclusion training procedure was evaluated from performances on these trials.

Each delayed-cue session consisted of a training block of 18 baseline trials interspersed with 18 trials with novel stimuli (Figure 1, right panels). Baseline trials were included to equate the number of trials across conditions. On the first trial, the S- stimuli disappeared 0.1 s after onset of the comparisons, leaving only the S+ visible. Delay duration increased by 0.5 s after each correct response and decreased by 0.5 s after each error. In subsequent sessions, the initial delay was increased to enhance the probability that the participant would respond before the cue (disappearance of S-). Nine outcome test trials without cues followed the training block. Samples were the novel words, and comparisons were the novel line


























































Set A--Exclusion			Set B--Delayed Cue		
Block 1	Sample	Comparisons	Block 1	Sample	Comparisons
6 baseline trials	"apple"	  	18 baseline trials	"apple"	  
3 control trials	"apple"	  	18 training trials		
3 exclusion trials	"shap" (novel 1)	  			
Block 2					
6 baseline trials	"apple"	  	"tay" (novel 1)	  	
3 control trials	"apple"	  	"fode" (novel 2)	  	
3 exclusion trials	"dite" (novel 2)	  	"jik" (novel 3)	  	
Block 3			Block 2		
6 baseline trials	"apple"	  	9 outcome trials		
3 control trials	"apple"	  	"tay"	  	
3 exclusion trials	"eeg" (novel 3)	  	"fode"	  	
Block 4			"jik"	  	
9 outcome trials	"shap"	  			
	"dite"	  			
	"eeg"	  			

Figure 1. Representative exclusion and delayed-cue training and outcome test trials for Sets A and B used with Jimmy.

drawings. Each trial type was presented randomly three times. The efficacy of the delayed-cue procedure was inferred from performances on these trials.

In both conditions, responses to S+ were followed by empirically identified food reinforcers (candy for Jimmy and chips for Rob). Criterion performance was correct responding on at least eight of nine outcome test trials for three consecutive sessions. Maintenance tests conducted 6 to 19 weeks after training consisted of 36 trials with each

novel dictated-word/symbol relation presented as the sample on 12 trials. No training procedures were in place.

RESULTS AND DISCUSSION

Jimmy's performances on outcome trials were more accurate on relations trained with delayed-cue procedures (Sets B and C) than exclusion (Sets A and D) (Figure 2). Accurate performance on Sets B and C was maintained 18 and 19 weeks after training, re-

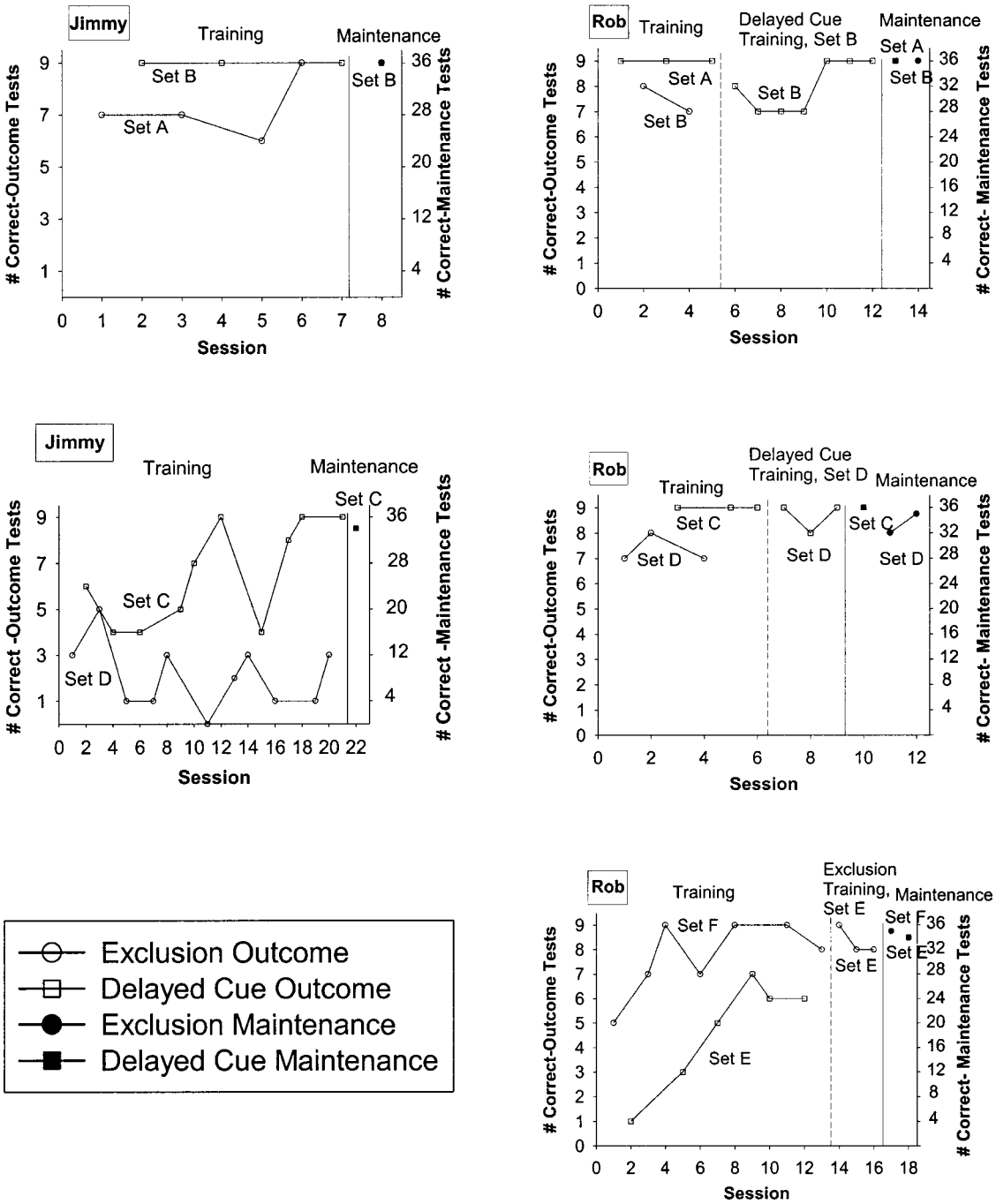


Figure 2. Number of correct responses on outcome test trials during exclusion and delayed-cue training sessions and during maintenance probes across novel sets for the 2 participants.

spectively. Rob's performance in the delayed-cue condition (Sets A and C) was 100% accurate from the outset, whereas performance with exclusion (Sets B and D) did not meet

criterion in initial training (Figure 2). However, the opposite results were obtained for Sets E and F. Crossover training with the more effective procedure in each comparison

was implemented until performance on the other relations met the training criterion. Performances on all maintenance tests conducted 6 weeks after training were highly accurate. The proportion of errors associated with the two training procedures was not substantially different for either participant.

Overall, both participants met the acquisition criterion more rapidly with the delayed-cue procedure than with exclusion training, perhaps because the novel relations were presented more frequently in the delayed-cue condition (see Figure 1). During exclusion training, each novel relation was introduced one at a time in succession, with the second and third relations juxtaposed with the just-learned novel relation. In the delayed-cue condition, all three novel relations were introduced concurrently. Therefore, the only difference between training and outcome test trials in the delayed-cue condition was the presence of the cue in the former. During exclusion, the novel relations were not presented together until the outcome test.

Other limitations of this study include the

small sample size, the use of arbitrary stimulus relations, and the controlled laboratory environment. Replications with other learners with autism and under more naturalistic conditions (e.g., tabletop training in classrooms with more educationally relevant stimuli) will be informative. Furthermore, in future comparisons, attempts should be made to make the two procedures more comparable by equating the number of exposures to novel stimuli as closely as possible.

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